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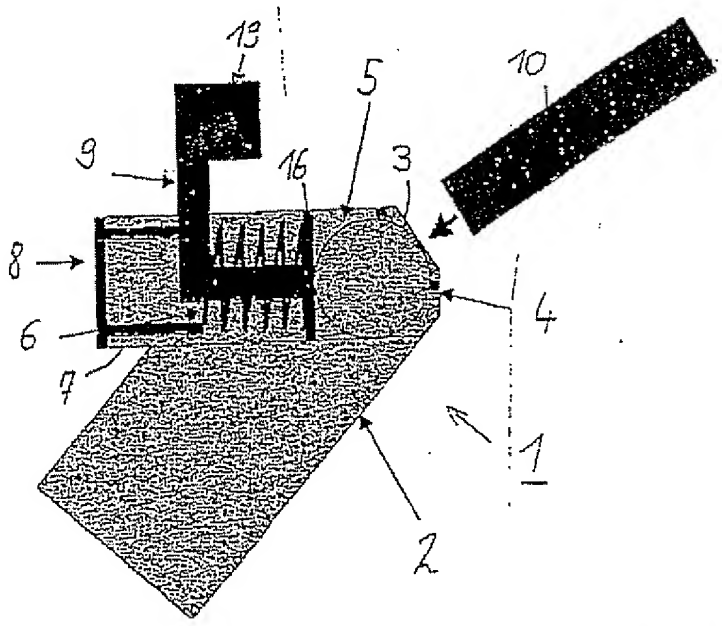
(54) Title: SEALING DEVICE FOR A TANK ACCESS OPENING IN PARTICULAR FOR TANK FILLER PIPES ON MOTOR VEHICLES

(54) Bezeichnung: VERSCHLUSSEINRICHTUNG FÜR EINE TANKZUGANGSÖFFNUNG, INSBESONDERE FÜR TANKSTUTZEN IN KRAFTFAHRZEUGEN



(57) Abstract: The invention relates to a sealing device (1), for a tank access opening (3), whereby a ball (5) is arranged to be displaced within the tank access opening (3). On introduction of a fuel nozzle (10), the ball (5) opens the tank access opening (3).

WO 2005/047041 A1

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(57) Zusammenfassung: Die Erfindung betrifft eine Verschlusseinrichtung (1) für eine Tankzugangsöffnung (3), bei der innerhalb der Tankzugangsöffnung (3) eine Kugel (5) verschieblich dergestalt gelagert ist, dass bei Einführen einer Zapfpistole (10) die Kugel (5) die Tankzugangsöffnung (3) freigibt.

SEALING DEVICE FOR A TANK ACCESS OPENING, IN PARTICULAR FOR FUEL TANK FILLER NECKS IN MOTOR VEHICLES

The invention relates to a sealing device for a tank access opening, in particular for tank filler necks in motor vehicles.

In the state of the art, fuel tank filler necks are sealed by means of screw caps, which may be of lockable design. Such filler caps are unwieldy, can be mislaid and especially in the case of diesel-engined vehicles can lead to a vehicle user getting his or her hands dirtier when refueling the vehicle.

The object of the present invention is to provide a sealing device for a tank access opening which can be manipulated comfortably whilst nevertheless ensuring a secure seal.

According to the invention this object is achieved by a sealing device for a tank access opening having the features of claim 1, in which a ball is displaceably supported inside the tank access opening in such a way that on introduction of a fuel nozzle the ball opens the tank access opening. The internally supported ball renders a screw cap superfluous, the sealing by means of a ball moreover having a self-intensifying effect if an excess pressure prevails inside the fuel tank filler neck.

In a further development of the invention the ball is supported on a guideway, which is aligned at an acute angle to the direction of insertion of the fuel nozzle and hence to the longitudinal extent of the fuel tank filler neck. The alignment at an acute angle means that on introduction of the fuel nozzle into the fuel tank filler neck a lateral force component is exerted on the

ball, so that the ball is pushed out of the direction of movement of the fuel nozzle.

In order to ensure precise guidance and exact application of the ball to the tank access opening, the ball is guided in a sleeve, the sleeve being designed so that the fuel nozzle can penetrate unimpeded into the fuel tank filler neck, that is to say there is a recess provided on the underside of the sleeve in the direction towards the fuel tank filler neck.

For secure and in particular gas-tight sealing of the access opening, a sealing ring, against which the ball rests in the sealing position, is arranged at the access opening. The seal preferably takes the form of an O-ring.

The ball diameter is preferably greater than the diameter of the tank access opening, in order to ensure a secure, positively locking closure of the tank access opening by the ball. The ball diameter is also advantageously greater than the diameter of the fuel nozzle, so that when the fuel nozzle is applied and a pressure is exerted the ball does not get caught in the fuel nozzle or become jammed by the latter.

In order to ensure an effective seal, the ball is acted upon by a force and in particular spring-loaded in the direction of the tank access opening, the spring preferably taking the form of a compression spring. Alternative devices for applying a force may be provided, for example by means of a weight or other force-storage devices arranged on a lever.

In order to retain the ball securely in the sealing position in the event of an accident or acceleration forces due to other causes, a counterweight, which is designed and arranged so that the tank access opening

is not opened merely due to an acceleration movement in the absence of any compressive force applied by way of a fuel nozzle, is assigned to the ball. For this purpose the counterweight is coupled to the ball by way of a lever or lever arrangement, a variation of the lever arms serving to reduce the necessary, absolute weight of the counterweight.

The sealing device advantageously takes the form of a pre-assembled module, which can be fixed to a fuel tank filler neck, so that this module merely has to be mounted on the fuel tank filler neck and fixed thereto in a gas-tight manner as part of the final assembly process.

An exemplary embodiment of the invention will be explained in more detail below with reference to the drawings attached, in which:

Fig. 1 shows a schematic representation of a sealing device in the sealing state, and

Fig. 2 shows a sealing device according to Fig. 1 in the refueling state.

Fig. 1 in a schematic representation shows a side view of a sealing device 1 of a fuel tank filler neck 2, which has a tank access opening 3. Arranged around the tank access opening 3 is a sealing ring 4, which takes the form of an O-ring. The tank access opening 3 is sealed by a ball 5, which is pressed against the seal 4 by a spring 6 and which seals the fuel tank filler neck 2 so that it is gas-tight.

The ball 3 is guided in a sleeve 7, which is sealed by a locking cap 8. The cap 8 serves to give access and serves for fitting the sealing device 1. The sleeve 7 is aligned at an acute angle α to the direction of

insertion of a fuel nozzle 10 and hence to the longitudinal extent of the fuel tank filler neck 2, and on introduction of the fuel nozzle 10 causes a displacement of the ball 5 from the sealing position along the sleeve 7. The fuel tank filler neck 2 is thereby opened for refueling.

In Fig. 1 the spring 6 takes the form of a compression spring, which by way of a slide 16 loads the ball 5 in the direction of the tank access opening 3. The slide 16 is coupled to a rotatably supported lever 9, a counterweight 19, which in the event of an accident serves to hold the ball 3 in the closed position by compensating for mass acceleration forces, being situated at the end of the lever 9 opposite the slide 16.

For refueling, a fuel nozzle 10 is introduced into the tank access opening 3 and pressed against the ball 5, which is displaced along the sleeve 7 and opens a passage to the fuel tank filler neck 2. The inserted fuel nozzle 10 holds the ball 5 in an opened position against the spring pressure of the spring 6.

This position, in which the fuel nozzle 10 is inserted through the tank access opening 3, is shown in Fig. 2. The compression spring 6 is compressed and the counterweight 19 is pivoted by the lever 9 in the direction of the fuel nozzle 10. In the area of the tank access opening 3 the sleeve 7 has a recess 7', through which the fuel nozzle 10 can pass, the passage opening 7' being smaller than the diameter of the ball 5.

On completion of the refueling process the fuel nozzle 10 is withdrawn from the fuel tank filler neck 2 and removed through the tank access opening 3. The spring 6 relaxes and presses the ball 5 along the sleeve 7 in

the direction of the seal 4, and closes the tank access opening 3 so that it is gas-tight. The slowness of the movement involved in opening and closing the tank access opening means that the counterweight 19 exerts only a minimal action in opposition to a displacement force and therefore does not interfere with the refueling process.

The sealing device 1 advantageously takes the form of a module, which can be mounted on a fuel tank filler neck 2. The entire sealing device 1 represented can therefore be pre-assembled and mounted on a fuel tank filler neck 2 of a fitted fuel tank as part of the final assembly process.